Nutrient Management Planning Regulations
Technical Advisory Committee Meeting – August 18, 2004
VT/UVA Richmond Center
2810 N. Parham Road, Suite 300

AGENDA ITEM – Welcome, Introductions and Agenda Overview

This third meeting of the Nutrient Management Regulations TAC was facilitated by the Institute for Environmental Negotiation. A listing of committee meeting attendees is provided in Attachment #1. Members were provided with a copy of the meeting minutes from the July 26, 2004 meeting for review and approval later in the meeting.

It was announced that the final meeting of the TAC will be held at the UVA and Virginia Tech Center in Richmond on Thursday, September 9 2004.

The facilitator reviewed five points for TAC consideration concerning the regulations.

1. They must protect water quality.
2. The must be straightforward and time efficient.
3. They must produce consistent results.
4. They must be easy to understand.
5. They must be able to be compatible with nutrient management software.

AGENDA ITEM – Timing of Nitrogen Application

Facilitator - The intent on the part of DCR was to show how the timing of applying nutrients can make a difference in terms of the fate of those nutrients. It was noted that this concept has already been applied to manure management.

Comment – Could there be a consistent approach to the timing that would affect all applicators?

Comment – Could the timing be varied by the kind of soil involved in a particular application and whether there are some soils that are higher risk?

Staff reviewed the handout presented at the last meeting concerning how environmental risk ratings of soils could work to prioritize timing of nitrogen applications. Information on the handout included:

1. Timing of Organic Nitrogen Sources (Manure and Biosolids)

a. High Nitrogen Environmental Risk Soils - Apply no more than 30 days prior to planting
b. Moderate and Low Risk Soils – Apply no more than 60 days prior to planting

2. Timing of High Carbon/Nitrogen Ratio Compost (>25:1 C:N)
No timing restrictions

3. Timing of Inorganic Nitrogen Sources (Commercial Nitrogen Fertilizers)

a. High and Moderate Nitrogen Environmental Risk Soils – Apply inorganic nitrogen in split applications

b. Low Nitrogen Environmental Risk Soils – May apply all nitrogen at planting for spring planted annual row crops

Staff noted the following:

- They have worked significantly with Dr. Jim Baker and Dr. Greg Mullins at Virginia Tech.
- The thought process on the handout is to treat all organic nutrient sources consistently. For manure VPA permits, there is a 30-day restriction for planting. With the biosolids there aren't presently any similar restrictions.
- If a material is composted with sufficient carbon being mixed with the nitrogen source, the resulting material is not very susceptible to loss.

Comment - Would this apply to perennial grass crops?

Staff - If it's a perennial crop that is a cool season grass like fescue, there is some growth activity possible over a much greater period than with annually planted crops, therefore the appropriate application window could be more lenient. If it's a warm season grass such as Bermuda grass, that is only actively growing in the spring summer and fall between last and first frost dates. We would have to build in some understanding of working with those cropping systems.

Comment – If commercial fertilizer contains forms of nitrogen that are slow release, could that be factored into the timing criteria?

Staff - Certain types of slowly available commercial fertilizers could be applied at planting on all soil types, since the slow release property of the material would provide similar benefits as efficient split applications. Staff supports clarification of the regulations to address this issue.

Comment – Would the timing restrictions would apply to land in which small grain winter cover crops are planted in the fall?

Staff - The intent with the 30-60 days prior to planting has more to do with ground that is fallow over the winter. If winter crops are in place, some application can be made in the late fall and winter. The committee will discuss rates appropriate for cover crops under miscellaneous issues in the next agenda item.

Comment – A concern was expressed regarding the moderate and low risk soils practice of applying more than 60 days ahead of planting. Since manure and biosolids will

contain phosphorus as well, isn't there some runoff risk if you're doing it 60 days ahead of planting?

Discussion - Several committee members voiced the concern for runoff losses for both N and P during the winter. There were also questions as to why farmers needed to apply nitrogen-containing sources as much as 60 days ahead of planting and what management practices would be in place to keep the nutrients from running off the land. A participant also noted that there are different risks to application and that there should be a scheme of timing relative to cover crops.

Staff - There was less concern with environmental loss based on timing of application for phosphorus as compared to nitrogen. With phosphorus, there is some threat of direct surface loss of the actual material being applied, but this may be addressed with phosphorus criteria depending on what method we choose. Concerning the need to have greater than 30 days prior to planting available for application on some sites, staff stated the need as primarily logistical (i.e., being able to apply on enough acres prior to planting considering lost days of operation due to weather, etc.) and lack of storage in the case of biosolids. Staff also noted that for applications more than 30 days out there should be some criteria for runoff for certain slopes and a requirement for there to be some residue cover for certain slopes.

Facilitator - The idea is that depending on the soil you have present, the application timing could be more flexible. There also appears to be support to specify some means of runoff control for sites receiving nutrients 30 – 60 days prior to planting, such as a requirement for previous crop residues or other runoff controls.

Comment – A concern was noted that high C/N materials could be applied at any time under the proposal, and that in the long run, all nutrients applied are subject to potential loss from the land.

Discussion - Other agencies supported the idea of preferential treatment of high C/N ration materials with respect to timing of applications. Support was expressed for using cover crops as an effective nutrient management tool. Staff indicated cover crops would be discussed more during the next agenda item.

Comment - Because we have milk and poultry products, we are going to have manure. The manure is viewed by farmers in terms of dollars. Any way we can help them manage the manure better is important. The proposal would give more needed flexibility in managing manure storage systems in a wet year.

Comment – A question was raised as to what the definition of pollution was, is it the excess materials in the soil or something else? Just because there is an excess of a compound, it does not constitute pollution. The excess needs to cause a problem off site or in the soil.

Staff - DCR is only dealing with plant nutrients as potential pollutants with this regulation, and not other potential pollutants.

Comment - Row crop agriculture is an inherently leaky system, however, well-managed biosolids can be applied. If you're going to accept agriculture you have to accept that we will have some nitrate loss.

Comment - The committee should consider timing of application issues very carefully since it will impact the biosolids sector. Cutting the window of available land application times will affect storage. Ratepayers would be impacted and need to pay additional money to pay for storage and/or alternative uses of biosolids.

A refined soil list was handed out to participants for discussion purposes. A copy of that list is provided as Attachment #2.

Facilitator - Does anyone have an issue of any particular soil being rated where it is?

Comment - What criteria was used by DCR and Virginia Tech staff in rating the soils?

Staff - The high risk category includes: (1) hydrologic group A soils, (2) soils that are categorized by NRCS as coarse-loamy or coarser (sandier) and are well drained or excessively drained, (3) poorly drained soils having potential for significant lateral flow of water or having subsurface drain tiles, and (4) shallow soils over fractured bedrock (such as soils found in Karst topography). Staff reiterated that DCR had worked with Virginia Tech staff to develop the criteria and that many hydrologic group B soils that would be considered "environmentally sensitive" in the present regulations, would be down-rated to a moderate or low risk using the proposed criteria.

Facilitator – What I'm hearing on the question of soils is that this is not a bad approach. Several people suggested it is a reasonable approach.

Comment - There would be costs to the environment of opening the application window for nutrients. The costs could be more impact on watermen livelihoods and tourism, for example.

Discussion - Participants re-emphasized the importance of small grain cover crops. Some felt that topography and slope should be considered in the nutrient risk factors for soils, as well as biological problems (e. coli, etc.).

Comment - Why were the 30 and 60-day periods chosen?

Staff - There is nothing magical about the 30 and 60 days as end points, but the further one gets ahead of optimum planting dates, the more environmental risk of nitrogen loss.

We are trying to reach a compromise with the 30 and 60-day criteria to balance the competing water quality and logistical issues.

Discussion - A participant stated that similar credit should be given to crop residue as compared to cover crops in preventing nitrate leaching. Another participant stated that crop residue will not prevent leaching on N. If anything, the residue would increase leaching since more water would infiltrate into the soil. Another participant asked to defer final thoughts on this topic until after the break and discussion of nutrient applications to the cover crop. Depending on how the cover crop is handled to address fall manure applications, there may not be a critical need for late winter applications more than 60 days before planting. The facilitator concurred that we test for consensus at the end of the cover crop discussion.

[BREAK]

A participant noted that there had been a lot of discussion regarding cover crops, but that crop residue should also be considered.

A participant said that crop residue would not help the leeching issue, but would actually increase leeching.

AGENDA ITEM – Miscellaneous Issues Discussion
The facilitator called the meeting back together and noted that the first discussion would be on cover crops.

Cover crops

Staff –In the existing regulation is there is a definition of cover crop. It relates to the function of a cover crop to assimilate residual nitrogen from a previous crop in an effort to reduce nitrogen leaching. It relates to nitrogen already in the soil, not what may be applied. We think it is reasonable that some level of nitrogen application could occur on cover crops. However, it is important to note that because the Chesapeake Bay Program assumes no nutrient application on cover crops, there will not be any credit for Bay Program Best Management Practice accounting purposes for acreage that would receive nitrogen applications.

Staff are undecided if they would modify the cover crop definition in the regulations or define a new term such as “green manure” that would be defined to allow some level of nitrogen application. Either way, staff may be receptive to a fall application rate in the range of 30-40 lbs. of nitrogen applied to crops that are planted in the fall that are not intended for harvest. If they are intended for harvest, there are already recommendations for those.

Presently DCR doesn’t have recommendations for cover crop situation of those same plants. The implication is that there are no nutrients applied to cover crops currently.

The other things to think about is what allowing applications would do to the long term nutrient balance of the field if you went with a rate of application that is intended for harvest and you're not actually removing anything nutrients from the field. It will definitely have some phosphorus implications as well. In terms of nitrogen, there will be carbon added to soils with these plant types (wheat, barley and rye) that are suitable as winter trap crops. The change would help to accommodate storage issues by providing additional times and fields for fall application.

Comment – How will phosphorus applications and crop removal be addressed?

Staff - Because there is no crop removal of phosphorus from sites with cover crops, no credit for phosphorus removal is appropriate. The cover crop is either killed to provide no-till cover for a subsequent crop, or tilled into the soil; the nutrients are not removed from the field.

Comment – I support the approach suggested since you will gain in terms of soil cover if you put some extra nitrogen on that cover crop because the amount of growth you get. Treat it as if it is growing for a purpose.

Comment - What difference does it make if the crop is harvested or not, why not allow the nitrogen to be applied at rates that would be acceptable if the crop were harvested?

Staff - If it is harvested for silage you have a fair amount of carbon removed and nitrogen removed. If it is harvested for grain a certain amount of nutrients in grain is hauled off. Staff are concerned that cover crops not be used to dispose of large amounts of manure nitrogen in the long-run. If the application were done year after year with limited or no harvest there would be a buildup of higher levels. The reason to allow some level of N application is more to accommodate timing issues and waste storage constraints, not to allow more animals on fewer acres.

Comment – Would spring grazing of cover crops be considered "harvest"?

Staff - The grazing animals would mostly just recycle nutrients to the site in manure deposited.

Discussion - There appeared to be general support for the idea of a wheat, barley, rye cover crop application rate of 30 – 40 pounds of nitrogen given that in some years the cover crop could utilize more N, but following drought years, no N would be preferable. To manage manure storage facilities, farmers need to know what level of N they can count on being able to apply, year after year.

Comment - For biosolids applications, 30-40 pounds N is difficult to apply, unless the biosolids were liquid. Even a rate of 80-100 pounds is difficult to apply with cake biosolids. Another question pertaining to biosolids was if it would be acceptable to apply

a corn rate in December on top of a rye cover crop and would the cover crop trap most of the nitrogen?

Virginia Tech. staff - There are too many variables from site to site to make an accurate prediction. You have to know soil types, you have to know rainfall amounts, what is the rate you are apply (going on a soil that has a low nitrogen requirement for corn versus one that has a high nitrogen requirement for corn. There are too many factors to consider at this point to think what the possibilities are.

Comment - For Southwest Virginia we need to be able to apply 30 – 40 pounds of N in manure to cover crops because the growing season is not long enough for most farmers to double crop. If we can't do this, many farms may need to have 360 days of manure storage.

Comment – Earlier today, Dr. Evanylo had made a statement that agriculture is a natural leaky process. Our goal is to reduce the leaks. Any regulatory changes that are more permissive are going in the wrong direction. Our goal should be how to reduce nutrient loss without impacting the farmer. In fertilizing cover crops there may be instances where you may need to do that, but a general policy of putting nitrogen on a cover crop is not doing what you want a cover crop to do.

Comment - Farms that had been managing nitrogen along the way would likely not create a problem with these suggested rates of application to a cover crop. Those that had not managed nitrogen carefully could cause a problem. The biggest problem is dealing with 10 percent of anything. Eighty percent of the farms do pretty good.

Facilitator – The agency might want to distinguish between farms where nitrogen has been managed in the past and those where it hasn't.

Comment - 95% of the problems are caused by 5% of the people. We're not dealing with the five percent that cause the problems. We haven't developed the tools here to deal with the 5%.

Facilitator - Last time at the end after the meeting we raised the possibility of an informal session about the issue of what could be done about the 5% causing the problems.

Discussion - Other participants voiced the need to stay focused on the regulations being discussed for today.

Virginia Tech. Staff - I do not disagree that the purpose of these regulations is to minimize nitrate leaching. There are situations where you don't want to even apply 30-40 lbs of nitrogen. However, in the majority of cases it is not an additive effect. A cover crop by itself will decrease nitrogen leeching because of the added growth of the cover crop. If you have 50 lbs in the soil and apply 30-40 lbs you will have less total leaching than if you added nothing because of the enhanced nitrogen availability at the time the

crop is first beginning growth. In cases except when you are following a drastic drought, you generally gain nitrogen-scavenging capability.

Comment – I want to lend my support to this proposal involving cover crops, Dr. Brinsfield has researched these issues in Maryland and said cover crops are one of the single best things we can do for nutrient management.

Staff - Even winter application should be considered acceptable at the same 30-40 pound cumulative N limit as long as the cover crop was timely established in the fall and application isn't made when the ground is frozen or saturated.

Comment – I object to the idea that a cover crop cannot be harvested. The cover crop needs to be planted like it is going to be harvested. Needs to be fertilized, established as a good growing crop. If we don't you will have a worthless crop that is no good for anybody. A concern was also voiced that the tightening down on the regulations would eliminate those doing voluntary nutrient management programs.

Staff - Two issues were relevant here. One applies to cost share payments, in which the presumption is that no nitrogen is applied. The second involves what would be appropriate in a nutrient management plan. Concerning cost share, we are not able to address that in this process. Concerning small grain cover crops in a nutrient management plan, staff have tried to develop a reasonable compromise. If a crop is planted for harvest, current Virginia Tech recommendations are to conduct a soil nitrate test in the fall and apply no nitrogen if the test reads 30 ppm nitrate-N in the top six inches. If the test is below 30 ppm, apply 15-30 pounds per acre. We are trying to find a way to use timely planted cover crops as a way to help manage waste storage and be reasonably protective of water quality. Under the proposal (in an NMP that has not had the cover crop cost shared), if a farmer is undecided if a crop is intended for cover or for harvest, they could treat it as a cover crop in the fall and apply 30-40 pounds of manure N. If a farmer later decides to plan on harvesting the wheat, barley or rye for silage or grain, they could topdress with nitrogen in late winter.

Discussion - Some participants commented that the change staff had proposed was needed and would give the farmer more flexibility and opening another window for application.

Facilitator - Has the committee had enough discussion of cover crops to assess how you feel about the overall earlier proposal for timing involving the three categories of nitrogen loss risk ratings for soils? One participant stated they were not ready without language about crop residue being equivalent to a cover crop. In the interest of time, the facilitator asked where people stood on the whole package, but would allow discussion of what could be changed to gain support of those that couldn't live with the outcome.

III. Fully support proposal – 10 members
II. Can live with the proposal – 7 members

I. Can't live with the proposal – 4 members

Facilitator – For those that signified I., let's make a list of what would need to change to move you to at least a two or three.

Comment – My concern is what staff said at the end. Having a cover crop would allow application at any point in the winter. I see this as a step back. My concern is that it is opening up application to anytime.

Facilitator - How would you fix it?

Answer – A participant suggested just allowing application to a cover crop in just fall, as well as well as addressing the concerns that were raised earlier as to what runoff management practices you would need to consider if you were applying in the 30-60 day time frame.

Comment – There are regulations in place that say not to apply on frozen ground, and where there are no actively growing crops, some controls are in place already.

Comment - VDH will have to look at this whole concept in our regulation advisory committee. If you put this in as a requirement for nutrient management and it conflicts with what we have in our regulations. Our regulations were built on a principle that DCR wase not going to be overly restrictive and the costs would greatly out weight the benefits. I do not know how much acreage is affected in the winter, but I'd say 10,000 acres maybe. We need to look at that through the VDH committee because we have a lot more factors.

Facilitator – Is there a specific proposal so you would be able to live with it?

Comment - VDH would have to hear from our constituents.

Comment – Another participant noted that there would need to be better runoff controls and further conditions related to the timing of nitrogen and phosphorus applications. The talk here has been about being more flexible. At the same time we're trying to protect water quality here. As was stated earlier, 53% of the nutrients reaching the Bay are coming from agriculture areas. I cannot support it unless there are some additional protections built in for the runoff and water quality impacts. I am concerned about hearing the need to store the materials on the fields without sufficient protections to make sure it is not running off.

Comment – It would have to be something along the lines where the moderate soils would be removed and at least a cover crop would be put down for winter months. Would also like to take more of a look into the application on land with residue. A desire was also expressed to be able to apply a corn rate in the late fall, middle of winter as long

as there was existing residue. A lot of the low risk soils are too wet to apply in the winter anyway.

Staff - The irony is that the soils we are most worried about in terms of nitrate leaching are the ones that are well drained or excessively drained. Those are the soils that some want to be able to apply nitrogen on at any time of the year.

Comments – A participant asked where the biosolids regulations conflict with this proposal. Another participant stated it was under the site management requirements of the regulation. Currently there are no restrictions as far as these two items in the biosolids regulation.

Mineralization Rates for Biosolids

Staff distributed a handout prepared by Dr. Greg Evanylo of the Crop and Soil Sciences Department at Virginia Tech. The handout, entitled "Suggested Nitrogen Mineralization Rates for Non Intensively Stabilized Biosolids* Land Applied in Virginia cover the following items:

> Results of the research by Gilmour et. al. (2000, 2003) were extended to the continental United States (excluding Alaska) by employing mean weather conditionals at 140 U.S. locations (see Figure 4-4, Gilmour et. al., 2000) to estimate weather correction factors (i.e., temperature and moisture) for developing a computer-generated national GIS- based N. mineralization map. The computer model DECOMPOSITION, first described by Gilmour and Clark (1988) was used to apply the data for use nationally. Annual N mineralization (K_{min}) was converted to effective mineralization (E_{min}) by multiplying each K_{min} value by 0.71 (the fraction of the annual mineralized N expected to be available to crops during the growing season).
>
> Effective N mineralization coefficients (E_{min}) for biosolids applied in Virginia.

	Non-irrigated soils	Irrigated soils	
Yr	All physiographic regions	East of Blue Ridge	West of Blue Ridge
	Fraction of organic N considered to be plant available for years after application		
0-1	0.30	0.35	0.30
1-2	0.10	0.15	0.15
2-3	0.10	0.10	0.10
3-4	0.05	0.05	0.05

> References for this information may be found in Attachment #3.
>
> * Non intensively stabilized biosolids include those that result from treatment processes such as primary, digestion (aerobic and anaerobic), lime stabilization, and heat-drying.

In discussions of the handout, Dr. Evanylo noted that the present mineralization rate coefficients for biosolids were developed in the late 1970s early 1980s. Those were

adopted by EPA and later by most state agencies. Several years ago, we were involved in a national project with researchers to have strategically placed studies that would have encompassed most of the major areas in the US.

There was a GIS based climate model that was then utilized to develop four years of estimated mineralization data. The data relevant to Virginia was extracted to produce the table. The table is somewhat detailed. Whether or not DCR wishes to adopt them to that level of detail or being more general is more of a policy decision. In the study, it was found that mineralization coefficients for most of the biosolids types encountered in Virginia were close enough that we should lump them into one group. For irrigated soils those rates would be slightly higher. Previously, we have been using mineralization rates that differ between the type of treatment method used. A new category has also been added for heat-treated and pelletized materials.

Staff - We see this as more of a technical change to fine-tune the mineralization rates. Some of the first year rates would go up and some of the year two ones are going down slightly. We propose that the new research findings should be incorporated into the regulations.

VDH staff - Heat treated and pelletized is not regulated as far as requiring a site-specific permit under the VDH regulations. If it was regulated, it would have been included. Not sure it should be in the DCR regulations since VDH will not be requiring Nutrient Management Plans for Class A biosolids.

Staff – Nutrient management plans should be able to deal with any type of nutrient source a farmer may encounter. We want certified planners to know how to integrate various nutrient sources into a single comprehensive recommendation for a field, so we would want to include the coefficients for heat treated and pelletized biosolids in Standards and Criteria.

Comment – These mineralization coefficients are much like the previous, they ignore 45% of the organic nitrogen in biosolids. That can become pollution. Only 55% of the organic nitrogen is accounted for in years 1-4.

Staff - With commercial fertilizer nitrogen, we count all of the nitrogen. With timely application, efficiency of use is relatively high. But when we work with organic nutrient sources, including biosolids and manure, the efficiency is not as great for several reasons. Some of the nitrogen in the organic form is tied up in the soil in more stable forms such as humus, some becomes subject to atmospheric loss over time. Mineralization rates of organic nitrogen vary by soil temperature and moisture levels. Some of the researchers have tended to be somewhat conservative in estimating nitrogen release rates because of this variability so that the crop gets the expected amount of nitrogen in most years. Unfortunately, this means that in some years, more N is released and is subject to possible environmental loss. The concern is valid, but this is a difficult issue. The mineralization coefficients are about the best we can do for now.

Facilitator –Participants were requested to look over the meeting summary and give us any suggestions for modification when we reconvene.

[LUNCH]

Facilitator – Reconvening after lunch the facilitator asked if members had comments or corrections concerning the minutes of the July 26, 2004 meeting. There were none.

Staff distributed a handout regarding items of concern noted at the previous meeting. A copy of this handout is provided in Attachment #4.

Soil Sampling

Staff - Depth of soil sampling was an issue that had been brought up as well as the need for standardized testing methods. Concerning sample depths, staff is proposing some clarification and more specific depths for sampling than the previous ranges in present language. The proposed changes to language are shown as strikeouts for deletions and underlined words for insertions. For fields where tillage occurs, the sample cores need to include all the soil between the ground surface and six inches of depth. For no-till sites, permanent hay, and pasture staff proposes that samples cores be taken from the ground surface to a four-inch depth. These are not spot samples taken at a specific depth, they need to include the entire core of soil between the field surface and the specified depth. The depths have been suggested by Dr. Mullins and staff concur.

To discuss the standardized methods, we believe we already largely address this issue presently. We use Virginia Tech's method as a basis for comparisons with various labs that analyze for phosphorus and potassium. Through sample exchanges, we attempt to develop statistical correlations between the labs and the methods they use. If we can derive a good correlation, we publish the conversion factors for planners to use. If we do not find a good correlation, we cannot accept the particular lab's results for use in a nutrient management plan. The Department incorporated conversion factors for two laboratories into previous regulations. Since then, we have approved two additional labs with correlations through guidance documents. We plan on incorporating the conversions for all four laboratories into our regulations with this promulgation. A question came up earlier about the use of the colormetric method. If it correlates with Virginia Tech's Mehlich 1 method, fine. If not, it can't be used.

Comment – So this is going in the regulation?
Staff – Yes.

Comment – Should the criteria specify a lab and the procedure they use?
Staff – That would be an enhancement we should incorporate.

Comment – How would you remove a lab if they change methods?

Staff – DCR could use the exemption to the Administrative Process Act to rapidly make a required technical change to the regulations.

Comment - The only thing I was going to say was really to DEQ. There is slightly differently language about sample depths in the proposed CAFO DEQ regulations. It would be nice to have them say the same thing.

Staff - We are trying to coordinate that.

Potassium, secondary and micronutrients

Staff – In 1995 with the initial regulations, there were several objectives DCR tried to balance in developing the language pertaining to this issue. First, there was concern that plans should not include recommendations for micronutrients, unless, they were needed by crops. Secondly, some nutrient sources like manure and sewage sludge contain micronutrients that may be in excess of crop needs. If they were not a financial cost to farmers and were not detrimental to the crop or the environment, the agency was not inclined to limit their application to fields. At that time, staff tried to craft language to say that these nutrients should be recommended at levels justifiable from an agronomic and economic perspective. The intent of the language was to discourage the use of a Nutrient Management Plan to sell nutrients that weren't needed, but would allow application of a "free" nutrient source if no harm was done.

Based on comments received from our own staff and from outside the agency, staff are proposing to strengthen the language. The specific situations cited are where manure or sludge does not contain much potassium and soil test levels are low in this nutrient. At a low soil test level for a nutrient, there is a high likelihood of crop response if that nutrient is applied. If one nutrient is limiting crop growth, uptake and utilization of other nutrients can be impacted and yields reduced. This leaves more nitrogen and phosphorus subject to environmental loss. Staff proposes to eliminate the problem by incorporating language that addresses this issue. We also would like to incorporate into Standards and Criteria the recommendations for micronutrients on certain crops such as boron on alfalfa that are standing recommendations from the Virginia Tech soil testing laboratory.

Comment - My only comment, maybe your plan was to cover the boron. Why not just go all the way and say that all nutrients should be specified in the plan to include primaries and the secondaries.

Staff – Staff indicated a willingness to consider this approach.

Comments – Further comments on the issue indicated that a broad approach may have some unintended impacts. For example, some labs do not routinely test for all micronutrients. Also, present DEQ and DCR regulations do not require testing for all these parameters. If testing becomes required in the NMP, then DEQ will have to enforce that this testing is done and used. There was a clear concern about going too far with micronutrients.

Comment – Perhaps the language should indicate that proper rates should be used in the plan if the soil was tested for the micronutrient.

Staff – Staff indicated that they understood these comments and the suggestion that we not go too far with possibilities that are not standing recommendations for crops.

Soil pH recommendations

Staff described the present treatment in regulations where soil pH influences nutrient availability. pH should be adjusted to levels suited for the crop. Plans shall contain lime recommendations. The staff proposal is that nutrient management planners shall not recommend lime or other materials that will move soil pH to unacceptable levels.

Comment – What is an optimum pH level?

Staff – We will have to publish some optimum levels in the form of ranges. For the upper end of the range, we would probably adopt levels similar to those specified in the Biosolids regulations.

Comment - Remember that the recommendations for a pH of 6.2 for most agronomic crops is based on the fact that the farmers are paying for lime. It was the lowest level of not getting a crop response to applied lime. We can certainly lime somewhat above that pH before we see a detrimental impact on crops.

Staff – We need to specify an acceptable range that goes above and below the absolute optimum of pH 6.2.

Comment – The recommendations state that lime should be applied based on Standards and Criteria. Why wouldn't we base it on a soil pH test?

Staff – They are based on a site-specific soil test.

Comment - In the valley for corn, you said the optimum pH is 6.2. Would I be in violation to tell a farmer that at a pH of 6.1 to add a ton of lime?

Staff – The acceptable range for your region would probably go up to approximately pH 6.8, so there would be no problem if we specify a range.

Land application setbacks and buffers

Staff described that in the existing regulations, there had been fairly good consistency between the DCR recommended setbacks, those in DEQ permits, and those in VDH permits. The situation has changed recently because of federal confined animal feeding regulations, that DEQ must conform with. Staff has no opinion on the best way to handle this. We can either all work for uniform setbacks, or DCR will specify baseline setbacks

for all Nutrient Management Plans with a statement that increased setbacks must be used if required in DEQ or VDH permits.

Facilitator – Either way, it looks like you avoid conflicting requirements.

Comment – Need to add Chesapeake Bay Preservation Act buffers.

Staff – Concur.

Comment – Use the EPA and VPDES requirement for 100-foot setbacks or 35-foot vegetative buffers. That would be least confusing.

Comment –Studies have shown that as the buffer length increases, the more protection you have. From the farmer point of view, that's a loss of productive land. I am not really sure what would be considered a minimum.

Comment – When it comes to occupied dwellings, we believe very strongly that the statement should have in it existing occupied dwellings and existing wells or springs. Farmer needs to take in to account what is there when he begins. If someone comes along afterwards, all you will do is constantly chew up his ability to spread manure. You are infringing upon the farmers land as well as neighbors.

Comment – You weren't intending to pull occupied buildings into this were you?

Staff – We suggest leaving the issue of occupied dwelling setbacks to DEQ and VDH. Setbacks from occupied dwellings may help address pathogen and nuisance issues, but are not a nutrient pollution issue. Staff does not want to place this setback in all Nutrient Management Plans.

Comment – A concern was expressed that the language may imply that the greatest buffers contained in any regulation would need to be used for all situations.

Staff – The intent was for only the relevant buffer to be used. If a farmer has a VPA permit, use the VPA buffer. If a VDH permit is involved, use the VDH buffer.

Comment – Since the federal government has already said a 100 feet, it should be a setback rather than a buffer if we can call it that. I think the 35-foot vegetative buffer represents a compromise already.

Comment - Since you have in the proposed phosphorus index language indicating that buffers should be equivalent to NRCS practice standards, why not make it the same consideration in this part of your regulations.

Comment- Seems like some of these are setbacks but others were buffers. If we refer to buffers, we should refer to a standard.

Comment- NRCS has standards and specifications for different BMPS if that's what we are saying here we should specify. There is difference in quality of vegetation.

Facilitator – Many of these comments involve reconciling this language. Maybe we can task staff with doing that.

Duration of Plans
Staff proposes to clarify that plans for cropland be limited to three years, similar to the life of a soil sample.

DEQ Comment – I am not suggesting the plan needs to be longer, but we find that as we move into phosphorus considerations, sometimes you have to move a job sheet in to a fourth year to show the phosphorus is used by the crop rotation.

Staff – The plan could expire in three years, but still show the phosphorus used by the crop in the fourth year for tracking purposes.

Flexibility Issues/Plan Modification
Staff discussed existing flexibilities already addressed in the DCR regulations. These pertain to various ways to derive the planning yields for crops. This directly impacts nitrogen rate of some crops. The allowable use of the pre-sidedress nitrate test (PSNT) was also discussed as a way to adjust nutrient application rates when needed due to weather conditions, and other factors.

Staff presented plan modification language that would improve the ease of changing crops in fields and other related elements.

Facilitator – In the interest of time, please provide any thoughts on this issue to staff before the next meeting. Fees will be carried over to the next meeting.

AGENDA ITEM – Phosphorus Management
The facilitator opened with a brief description of a new handout of two specific phosphorus management proposals developed by staff. Handout issues included:

Proposal 1
For All Organic Nutrient Sources – Use Current Poultry Waste Management Act Criteria + Cap + Soil Conservation Plan Phase-in

A. Phosphorus application rates shall not exceed greater of crop nutrient needs or crop nutrient removal.
B. Phosphorus shall not be applied to soils when phosphorus saturation levels are greater than 65%.

Region	**65% Saturation Mehlich 1 (ppm)**		
	Pasture/Hayland	Continuous No-till	All Others
Ridge and Valley	373	466	560
Piedmont & Upper Coastal Plain	264	330	397
Lower Coastal Plain	196	245	295
Soil Sample Depth	0 - 4”	0 - 4”	0 - 6”

C. **For cropland (row crops)** a soil conservation plan to a maximum soil loss of “T” developed in accordance with the USDA NRCS Field Office Technical Guide is required as part of the nutrient management plan if phosphorus saturation levels are above 35%.

Region	**Cropland 35% Saturation Mehlich 1 (ppm)**
Ridge and Valley	165
Piedmont & Upper Coastal Plain	148
Lower Coastal Plain	127

Proposal 2

Phosphorus Index with Simplified Erosion Risk Assessment

A. An “erosion risk assessment” would be used to provide the soil loss input to the P-Index.

The necessary inputs include:

1. Soil survey slope category A, B, C, D, E or F (already input into NutMan software).
2. Soil erodibility factor for soils – to be databased NutMan by soil name or mapping unit.
3. Rainfall intensity factor – to be databased in NutMan by county.
4. General residue cover at planting must be input by planner: (1) High residue planting of > 60% residue cover = no-till, (2) Medium residue planting of 30-60% residue = minimum till, (3) Low residue planting of < 30% residue = conventional tillage. The intent here will be to develop this factor such that minor changes in crop types will not impact the final result, however the factor will need to be somewhat conservative in terms of water quality protection. This means the farmer could have the flexibility to make reasonable changes in cropping plans without needing to re-run the P-index or modify the NMP since the factor would not be sensitive to minor changes.

B. The remainder of the P-Index remains intact. The P-Index will still require assessment of buffer widths and distance to stream through a field visit.

C. We expect that the entire process above plus the P-Index should be capable of being incorporated into NutMan software.

D. ***Option – At the planner's and farmer's discretion:*** If an NRCS approved soil erosion plan developed using RUSLE2 is available, the soil loss from the NRCS RUSLE2 plan may be input into NutMan in lieu of the erosion risk assessment. Existing soil conservation plans developed using USLE or RUSLE may not be used.

E. If the approved soil erosion plan will be used, the crop rotations and other practices in the NMP must conform to those of the soil conservation plan. Any change in crops or tillage triggers the need for a new soil conservation plan, P-Index calculation, and modified NMP.

Staff - We identified four different general approaches at the last meeting. Given the comments at that meeting, staff fashioned two possible approaches (outlined above).

The first proposal was described as being based on the present phosphorus criteria for poultry waste, but adding consideration of a soil erosion plan component that would take effect on sites where phosphorus saturation is more than 35%, and allowing no further P application once sites exceeded 65% saturation, the same as in the P-Index.

Comment - Could DCR develop a table comparing various sites as was done with the four options previously to help better understand the difference.

Staff - It could be done.

Comment - What phosphorous are we talking about, total or available?

Staff - DCR currently defines plant available phosphorus over the crop rotation at 100% for biosolids and manure.

Comment – Are the ppm numbers presented soil phosphorus levels and do they address all regions of the state.

Staff - Yes.

Comment - Under item C in proposal 1, who is responsible for preparing the soil conservation plan?

Staff – For the planner to recommend phosphorus applications above 35% saturation, the farmer would have to obtain a conservation plan. The agency's preference would be to say an NRCS approved soil conservation plan.

Comment - If you have private planners, they may not have the ability to generate an approved conservation plan.

Comment - Soil and water conservation districts could approve the soil conservation plan.

Discussion - The SWCD representative did not know if districts would want to take this on. Staff indicated the present proposal only states the need for the soil conservation plan to meet NRCS criteria.

Comment - Do we know what percentage of the soils that go through the Virginia Tech lab that hit these levels?

Staff – Virginia Tech had been asked to provide the data for Rockingham, Accomack and Amelia Counties. Numbers provided to the group were as follows:

Soil Test P
Distribution according to the Low, Medium, High, and Very High categories of the Virginia Tech Soil Testing Laboratory

Sub-Group	Rockingham (%)	Amelia (%)	Accomack (%)
Low	5	5	2
Medium	11	15	11
High	24	40	34
Very High	60	40	53

Distribution of all Agronomic Crops according to the Degree of Phosphorus Saturation

Degree of P Soil Saturation	Rockingham (%)	Amelia (%)	Accomack (%)
<20%	39	63	50
20-35%	37	27	34
>35%	24	10	15
>65%	2	1	1

Comment – Could the soil loss assessment in proposal 2 be utilized in lieu of the conservation plan.

Staff - This could be considered, but the final result would need to be an enforceable component of an NMP.

Comment – Is it correct to say there would not be a case where you could still apply based on nitrogen?

Staff - The statement is correct except where soil test levels would be low enough for there to be a significant crop need for phosphorus.

Staff - In general terms, it appeared proposal 1 would impact the swine industry and biosolids more so than proposal 2. For dairy farms that do not also have poultry operations, the overall impact may not be much different than proposal 2. For poultry farms, proposal 1 is the closest to their present requirements.

Comment – It was suggested that the first alternative is diminished because it is not science based. As an example, we know that erosion is a major lost pathway for phosphorus, but option 1 would only require conservation plans on 17% of the fields. On the other 83% of the fields, we would not be worried about erosion. We have to go beyond T if we are going to clean up water.

Comment - In the valley a lot of the fields will be affected. The farmers cannot just cut off spreading the manure. Until we find a way for them to move that manure and litter we cannot just cut the spigot off entirely. Realistically the farmers cannot take a whole lot more tightening down.

Comment - The first thing I want to say is that I appreciate the effort to come up with something that is readily understandable. However, again this seems to be even less protective than what we were talking about at the last meeting. I would comment that there is a legitimate concern about eliminating a farmer's ability to apply manure, but that is the reality we are dealing with, there are going to be fields where they can apply.

Comment – It seems to me that the first option is good if you want to dispose of fertilizer and nutrients. I don't think water quality will approve.

Comment – As a Nutrient Management Plan writer, I appreciate the attempt to come up with proposal 1. As someone who is in the field, it is an approach to consider, but I do not want to be responsible for writing a soil loss plan.

Comment – Staff hit the subject earlier, proposal 1 would not work for the biosolids or hog industry.

Staff - There is a scientific basis for the 65% cap with research indicating that this level could result in runoff concentrations of 1 ppm of orthophosphorus. There is also a basis for requiring a soil conservation plan at 35% saturation, as this is the level that scientists have suggested we should begin getting very concerned about environmental impacts of phosphorus. Conceptually, this approach (proposal 1) stays with crop removal over a broad range of soil phosphorus levels.

[Break]

A review of proposal 2 began after the break.

Proposal 2. Phosphorus Index with Simplified Erosion Risk Assessment

Staff presented an overview of this option as leaving the phosphorus index intact, but include a simplification in the form of an erosion risk assessment. A concern with the P-Index expressed at the last meeting was the complexity and time needed to collect data to run the index. This proposal uses mostly information already gathered to develop NMPs to arrive at an erosion risk. What we envision is three categories of crop residue, low residue, medium residue and high residue. There are standard break points used by NRCS of 30 and 60% that could be used to separate the categories. Part of the compromise would be that it is not going to be as complicated nor as refined as doing a complete RUSLE2 assessment of soil loss. However, some factors would be designed to cover a range of conditions so that the result would not change with minor changes in cropping systems or tillage implements used. In so doing, we would be going on the high end as far as a factor's range of impact on soil loss, and that would be the downside of this approach.

There would definitely be instances where a soil conservation plan based on RUSLE2 would come up with lower soil loss estimates. However, staff proposes that the farmer have the option of using a soil conservation plan developed using RUSLE2 to supply the soil loss input to the P-Index in lieu of the erosion risk assessment. However, in this case, the soil conservation plan would become part of the NMP. Cropping systems in both plans would need to match exactly, and for those with permits, the soil conservation plan would be an enforceable part of the NMP. Those who need to be able to apply as much phosphorus as possible would probably opt for the soil conservation plan, but they would give up some flexibility in being able to more easily modify cropping plans.

Comment - According to my consultant, the P-Index approach will cost me conservatively $48,000 per year. What are you going to get out of my plan. It will cost more for a planner. I will also have to move manure to different farms. Staff responded that the purpose of the plan is to improve water quality.

Comment – Is there a difference between a soil erosion plan and a soil conservation plan?

Response by NRCS: The NRCS plan is a soil conservation plan.

Comment – Has Dr. Mullins had an opportunity to talk to you about these changes? Staff responded that since the implementation concerns with the P-Index were expressed at the last meeting, DCR staff had met with NRCS and Virginia Tech staff. In these conversations, staff found that Dr. Mullins and NRCS are receptive to the concerns of the people on this committee.

Comment - Since we have seen both options, I have a preference for what would be a more soil and site specific approach. It would be the P-index. With today's changes, it also appears to provide more flexibility.

Comment - From a plan writing standpoint, anytime I can get a plan that is accepted without having to use a RUSLE part of it is good. The RUSLE part of these plans is too technical..

Facilitator - Would you actually be able to use this?

Comment –I am more receptive to this without the RUSLE part than I am with it.

Comment – Would you count hay land as high residue?

Staff – Yes.

Comment - The state of North Carolina started running a similar assessment tool. Also has requirement that you run RUSLE. County NRCS and soil and water offices are looking for ways to simplify the RUSLE part. You can generate a database format with a lot of consolidation of properties to save time. I think it is very doable.

Comment – Will the poultry industry be able to take advantage of these any better than we were at the last meeting? At the last meeting we determined they could not take advantage of any higher potential application rates.

Staff – Right now the poultry law is pretty clear that poultry manure applications would have to meet the more stringent of existing requirements or any new requirements. We may end up having to discuss the possibility of revisiting the law.

Comment – Are these two proposals the only two on the table?

Staff – Based on all the ideas presented so far, we narrowed down the choices from the original four broad concepts to these two fairly specific compromise approaches at this point.

Comment – I do not recall the entire group saying that we need to have a cap at some level. The poultry law as it is was one option because we did not want the spigot cut off. At this point I can't support either of these.

Staff – A 65% saturation phosphorus level in the soil is an astronomical level that doesn't appear to impact many fields based on the Virginia Tech soil test data.

Comment – What point triggers the need to run the P-Index?

Response by NRCS: 20% saturation

Question - Would you still need the buffer area in proposal 2 item B if it is below 20% saturation?

Staff – No, the P-Index would not need to be calculated if below 20% saturation.

Comment – With either one of these options we choose to take, a concern I have is that we do not have a clear crystal ball on what kind of timetables we have on water quality issues and when they are going to happen. Need wording that the planner helps the farmer understand what is happening with his phosphorus on his farms. If the level of P in soils continues to rise, they need to understand the long-term consequences to their operation. We would be remiss not to make sure they understand that is happening. I think an educational component that these farmers understand needs to be in this. Then they can make decisions.

Staff – We need to write a plan whenever we can based on soil test phosphorous and crop needs.

Comment – A couple of issues I want to raise that were brought up last time, one being a better definition of a buffer as being under the control of the operator and two, the issue of one part per million of P in runoff being acceptable.

Staff – Both of these have been discussed with Virginia Tech staff. First, the P-Index team sees the buffer ownership as a policy issue (rather than a technical issue) that DCR could specify in regulation if determined to be appropriate. Second, I believe the experimental methods used would result in the 1 ppm of ortho-P being a worst-case scenario.

Staff – We had talked with Virginia Tech when the P-index was being developed and learned that 1 part per million was being used as a cutoff level for runoff. They considered using 0.5 ppm, but it quickly lowered the whole range of utility for making P applications. At this time, they have opted to leave the cutoff at 1 ppm.

Staff – Once water quality standards are established in the near future, the problematic question will be what to do in watersheds where the water quality standard is not met if farms are already implementing phosphorus based plans using whatever criteria we settle on here. The challenge will be to figure out how to reverse the process and determine the level of phosphorus management and nutrient management plan criteria necessary to then meet the standard. That is one of the reasons you are seeing things like a cap on soil phosphorus levels being proposed. If we do not start getting some type of controls on severe situations now, we will be headed for a much worse scenario later. The proposals do not solve the phosphorus problem long-term, but this is a step forward. The rest may come in a few years.

Comment - I see the 1 ppm as an inconsistent policy with where water quality nutrient standards are headed.

Comment –Some of this is a national issue. I have a question concerning what is beginning done at the national level? It's not just an issue concerning the Chesapeake Bay. It encompasses the Gulf of Mexico and many estuaries.

Comment - How do you pass this on to the public so that the farmer doesn't have to bear the entire cost?

NRCS Response – There is money being allocated to these issues, such as more money to help writing nutrient management plans. I do not have the whole answer for the big picture.

Comment - Seems like any outcome does not change anything with poultry.

Staff – Actually the proposals would make it tighter for poultry too.

Comment – I have observed over the last couple of years how much erosion actually occurs. Much of this occurs in big flood events and it goes much further than the receiving stream. Is there any way to have additional risk assessment for flood events? The implication is that the setbacks and other practices would need to be more intense.

Comment - I want to echo what Greg Mullins said at the last meeting. The P-index is a temporary fix. In the meantime, how do we distribute the manure to the lowest risk sites? NRCS supports this approach because it will be based as much as possible on the specifics of the site. A great deal of research went into this. From the perspective of NRCS, we allowed the erosion estimate to be simplified. I think the compromise here is that erosion remains a consideration.

Based on the information provided, the facilitator tested for consensus on the two proposals.

Proposal 1
III. Fully support - 0
II. Can live with it - 5
I. Can't live with it - 12
No opinion at this point - 2

Proposal 2
III. Fully support - 4
II. Can live with it - 8
I. Can't live with it - 3
No opinion at this point - 4

Facilitator – Let's go to option 1 for the 12 people that were not able to live with it. Looking for very specific proposals of what you would like DCR to change in order for you to live it.

Comments on Proposal 1:

- Should remove the cap.
- Allow 1 ½ time crop removal.
- Concern for potential NRCS plan approval by the Soil and Water Conservation Districts.
- Should substitute "erodability factor" in P-Index for "Part C".
- Doesn't address erosion on enough land and "T" is seen as not strong enough by NRCS.
- Should be science based.
- Needs to be more protective of water quality.
- Would greatly restrict biosolids applications because of P-base.
- Needs to be easier to implement.
- Soil test values are too general, not just physiographic soils.

Comments on Proposal 2:
P Index "Light"

- Soil, site and material specific
- Addresses RUSLE issue – simplifies
- Allows bounded flexibility
- Poultry bound by Poultry Management Act provisions
- If below 20% saturation, nitrogen based plan, buffers not required
- Needs farmer educational component "anticipate and prevent" attitude
- Buffer under control of the operator?
- Inconsistency between P index and state Bay policy?
- Additional risk from fields in flood plain
- Distributes manure to lowest risk sites
- May allow some farmers to apply more.

AGENDA ITEM – Public Comment

The facilitator opened the floor for public comment.

Mr. L. Bruce Hollow, Accomack County farmer and president of the Virginia Agricultural and Consumer Services Board asked the members to consider the impact on farmers.

Mr. Tony Keen of Keen Consulting said that he thought the committee was taking the matter in the wrong direction. He noted a concern that in the discussion of the P-Index

the committee discussed particular and soluble phosphorous. He noted that credits were given for buffer zones, but none for compacted soils.

The facilitator reminded members that the last meeting of the committee will be September 9th in Richmond.

There being no further discussion, the meeting was adjourned.

Attachment #1
Attendance List, August 18, 2004

TAC Members
Hobey Baughan (for George Ashman)
Dr. Asmare Atalay, Virginia State University
Dr. Tom Benzing, CNMP, James Madison University
Dr. Theo Dillaha, Virginia Tech Biological Systems Engineering Dept.
Dr. Greg Evanylo (for Dr. Greg Mullins), Virginia Tech
Gary Flory, CNMP, Virginia Department of Environmental Quality
Gerald Garber, Augusta County dairy farmer
Mark Hedrick, CNMP, Pilgrim's Pride
Ann Jennings, Chesapeake Bay Foundation
Lynton Land, Northumberland Association for Progressive Stewardship
Peter Maybach, CNMP, M&M Consulting
Steve McMahan, CNMP, Synagro
Dr. Cal Sawyer, Virginia Department of Health
Joedy Sheets, CNMP – Valley Fertilizer and Chemical
Kay Slaughter, Southern Environmental Law Center
Wilmer Stoneman (for Bill Nelson)
Jim Tate, (for Sharon Conner) Hanover-Caroline SWCD
Kraig Westerbeek, Murphy Brown

DCR Supporting Technical Staff
Jack Frye, Division Director of Soil and Water Conservation
Stuart Wilson, Asst. Division Director for NPS Programs
Russ Perkinson, CNMP, Nutrient Management Program Manager
David Kindig, CNMP, Nutrient Management Training and Certification Coordinator
Dean Gall, CNMP, Nutrient Management Specialist (Dublin, VA)
Joe Garner, CNMP, Nutrient Management Specialist (Tappahannock, VA)
Scott Ambler, Nutrient Management Specialist

DCR Regulatory Staff
Leon App, Chief Deputy Director and Regulatory Coordinator
David Dowling, Policy and Planning Manager
Michael Fletcher, Director of Development

Facilitators
Tanya Denckla Cobb, UVA, Institute for Environmental Negotiation
Bruce Dotson, UVA Institute for Environmental Negotiation

Others
Karl Berger, Metro Washington Council of Governments
L. Bruce Hollow, Accomack County farmer
Tony Keen, Keen Consulting, Inc.

Katie Kyger, Virginia Agribusiness Council
Missy Neff, Aqualaw, PLC
Jacob Powell, Murphy Brown
Susan Trumbo, Recyc Systems, Inc.
Chris Zirkle, Pilgrim's Pride

Attachment #2

High Nitrogen Risk Soils

Soil Name	Risk Factor
Alaga	L
Allegheny	S
Alonemill	L
Alticrest	S
Aquents	D
Arapahoe	D
Ashe	L
Ashlar	L
Assateague	L
Atkins	D
Aura	L
Axis	D
Backbay	D
Baile	D
Balsam	S
Beech Grove	S
Belhaven	D
Benthole	L
Berks	S
Berks variant	S
Bethesda	L
Bibb	D
Biltmore	L
Bland	S
Blairton	S
Blocktown	S
Bloodyhorse	L
Bojac, Eastern Shore	L
Bojac, mainland	L
Bonneau	L
Bookwood	S
Bowmansville	D
Brandywine	L
Bremo	L
Brentsville	S
Brownwood	L
Brushy	S
Bugley	S
Buncombe	L
Calvin	S
Camocca	D
Caneyville	S
Carbo	S
Carbo	S
Cardiff	L
Cartecay	L
Cataska	S
Catlett	S
Catoctin	S
Catpoint	L
Caverns	L
Cedarcreek	S
Chagrin variant	L
Chandler	L
Chatuge	D
Chavies	L
Chavies variant	L
Check	D
Chestnut	L
Chilhowie	S
Chincoteague	D
Chiswell	S
Clearbrook	S
Cliffield	L
Cloverlick	L
Colvard	L
Combs	L
Comus	L
Conetoe	L
Corydon	S
Cowee	S
Craggey	S
Craigsville	L
Cullasaja	L
Daleville	D
Dandridge	S
Dawhoo variant	D
Dekalb	L
Deloss, drained	D
Deloss, undrained	D
Derroc	L
Devotion	L
Dismal	D
Dorovan	D
Downer	L
Drall	L
Drypond	S
Duckston	D
Dystrochrepts	L
Edneyville	L
Elliber	L
Fairpoint	S
Fallsington	D
Faywood	S
Featherstone	D
Fiveblock	L
Fluvaquents	D
Fluvaquents, saline	D
Fresh water swamp	D

Fripp	L
Gainesboro	S
Galestown	L
Galtsmill	L
Gilpin	S
Gladehill	L
Goldston	L
Greenlee	L
Griffinsburg	S
Grigsby	L
Grimsley	L
Gunstock	S
Haplaquepts	L
Hartleton	S
Hatboro	D
Hawksbill	L
Haywood	L
Hazel	S
Hazleton	S
Highsplint	L
Hobucken	D
Holly	D
Hyde	D
Hydraquents	D
Itmann	S
Jefferson variant	L
Johnston	D
Junaluska	S
Kaymine	S
Kenansville	L
Kinston	D
Klinesville	S
Konnarock	S
Lakeland	L
Lakin	L
Lanexa	D
Lawnes	D
Lehew	S
Leon	D
Leetonia	S
Levy	D
Lew	L
Lewisberry	L
Lily	S
Litz	S
Lostcove	L
Louisa	L
Louisa variant	L
Louisburg	L
Louisburg, hapludalfs	L
Lucy	L
Lumbee	D
Lumbee variant	D
Macove	L
Madsheep	S
Magotha	D
Mandy	S
Manor	L
Manteo	S
Marbleyard	L
Markes	D
Marrowbone	S
Massanutten	S
Matewan	L
Matneflat	L
Mattan	D
Meadowfield	S
Meadows	S
Melfa	D
Millrock	L
Mine Run	L
Mixed alluvium, poorly drained	D
Molena	L
Mt Rogers	L
Muckalee	D
Myatt	D
Myatt variant	D
Nawney	D
Nestoria	S
Newbern	S
Newhan	L
Nikwasi	D
Nimmo	D
Oakhill	L
Ochlockonee	L
Ochraquults	D
Ochrepts, A/D	D
Ochrepts, B/D	D
Ogles	L
Opequon	S
Oriskany	L
Osier	D
Paddyknob	S
Palms variant	D
Pamlico	D
Pamunkey variant	L
Parker	L
Partlow	D
Pasquotank	D
Peaks	S
Philomont	L
Pigeonroost	S
Pilot Mountain	L
Pinkston	L
Pocaty	D
Polawana	D
Pope	L

Portsmouth, drained	D
Portsmouth, undrained	D
Poynor	L
Psamments, well drained	L
Pungo	D
Rains	D
Ramsey	S
Rappahannock	D
Remlik	L
Rigley	L
Rixeyville	S
Rough	S
Rumford	L
Rushtown	L
Schaffenaker	L
Sekil	L
Sequoia	S
Sewell	S
Sherando	L
Spessard	L
Steinsburg	L
Stonecoal	S
Stumptown	L
Sulfaquents	D
Swamp	D
Sweetapple	L
Sylco	S
Sylvatus	S
Talladega	S
Tanasee	L
Tankerville	S
Tarboro	L
Terric Haplohemists	D
Thunder	L
Tioga	L
Tipples	S
Tomotley, drained	D
Tomotley, undrained	D
Torhunta	D
Toxaway	D
Trussell	D
Tusquitee, coarse loamy	L
Typic Udorthents	D
Uchee	L
Udalfs	D
Udifluvents, fine loamy	D
Udults, well drained	D
Wallen	S
Walnut	L
Wando	L
Wateree	L
Watt	S
Watt variant	S
Webbtown	S
Weeksville	D
Wehadkee	D
Weikert	S
Weikert, exc drained	S
Weston	D
Westphalia	L
Weverton	L
Widgett	L
Woodington	D
Wurno	S
Yogaville	D
Zepp	L

Risk Factors:
D = High potential for subsurface lateral flow based on soil texture and drainage
L = High potential for leaching based on soil texture and/or excessive drainage
S = Shallow soil likely to be located over fractured bedrock or Karst areas

Moderate Nitrogen Risk Soils

Soil Name	Risk Factor
Alanthus	L2
Albemarle	L2
Alonzville	L2
Arcola	L2
Ayersville	L2
Bailegap	L2
Bama	L2
Bedington	L2
Bellspur	L2
Bermudian	L2
Bluemount	L2
Bolton	L2
Brecknock	L2
Brevard	L2
Brinklow	L2
Bucks	L2
Cardova	L2
Chagrin	L2
Chesapeake	L2
Chester	L2
Claiborne	L2
Clymer	L2
Cottonbend	L2
Culleoka	L2

Dan River	L2
Dothan	L2
Draper	L2
Drapermill	L2
Duffield	L2
Dumfries	L2
Durham	L2
Edgemont	L2
Edneytown	L2
Elsinboro	L2
Emporia	L2
Escatawba	L2
Eubanks	L2
Evard	L2
Frankstown	L2
Gaila	L2
Glenelg	L2
Glenelg, Blue Ridge	L2
Glenelg, New River Valley	L2
Grover	L2
Happyland	L2
Hayter	L2
Hazel Run	L2
Hickoryknob	L2
Ingledove	L2
Jefferson	L2
Kalmia	L2
Keener	L2
Kempsville	L2
Kibler	L2
Laidig	L2
LaRoque	L2
Leck Kill	L2
Leedsville	L2
Legore	L2
Marr	L2
McCamy	L2
McClung	L2
Meadowville	L2
Middleburg	L2
Montonia	L2
Morven	L2
Murrill	L2
Myersville	L2
Nolichucky	L2
Norfolk	L2
Oatlands	L2
Occoquan	L2
Orangeburg	L2
Ostin	L2
Ott	L2
Pamunkey	L2
Panorama	L2
Penn	L2
Pineola	L2
Pineville	L2
Pinoka	L2
Poindexter	L2
Porters	L2
Rayne	L2
Rhodhiss	L2
Rion	L2
Riverview	L2
Ross	L2
Ruston	L2
Sassafras	L2
Saunook	L2
Sauratown	L2
Shelocta	L2
Speedwell	L2
Spriggs	L2
Starr	L2
State	L2
Statler	L2
Stott Knob	L2
Suches	L2
Sudley	L2
Suffolk	L2
Tate	L2
Thurmont	L2
Timberville variant	L2
Trego	L2
Trimont	L2
Tuckahoe	L2
Tuckasegee	L2
Tusquitee, fine loamy	L2
Vaucluse	L2
Watahala	L2
Watauga	L2
Westmoreland	L2
Wheeling	L2
Whiteford	L2
Wickham	L2
Wickham variant	L2
Wingina	L2
Wolfgap	L2
Wyrick	L2

L2 = Moderate soil nitrate leaching risk

Low Nitrogen Risk Soils

compname
Abell
Aden

Airmont
Albano
Alderflats
Aldino
Altavista
Altavista variant
Angie
Appling
Appling gritty
Appomattox
Aqualfs
Aquic Udifluvents
Aquults
Argent
Ashburn
Atlee
Augusta variant
Augusta, drained
Augusta, undrained
Austinville
Aycock
Badin
Banister
Batteau
Beckham
Beltsville
Belvoir
Bentley
Bertie
Bethera
Birdsboro
Bladen
Bohicket
Bolling
Bolling variant
Botetourt
Bourne
Bourne variant
Braddock
Brickhaven
Broadway
Brockroad
Brumbaugh
Buchanan
Buckhall
Buckton
Buffstat
Calverton
Carbonton
Caroline
Catharpin
Cecil
Chapanoke
Chastain
Chenneby
Chewacla
Chickahominy
Chipley
Christian
Clapham
Clifford
Clover
Clubcaf
Codorus
Codorus variant
Colescreek
Colfax
Colfax variant
Colleen
Congaree
Coosaw
Cordorus
Corolla
Cotaco
Coursey
Coxville
Creedmoor variant
Croton
Cullen
Culpeper
Danripple
Davidson
Delanco
Delila
Dellwood
Diana Mills
Dillard
Dillsboro
Dragston
Dunbar
Dunning
Duplin
Dyke
Easthamlet
Ebbing
Edom
Edgehill
Edgehill variant
Elbert
Elbert variant
Elioak
Elkton
Endcav
Enon
Enott
Ernest
Eunola
Evansham

Exum
Faceville
Fairfax
Fairview
Fairystone
Fauq
Fauquier
Feedstone
Fisherman
Fletcher
Flume
Fluvanna
Fluvaquents, ponded
Forestdale
Fork
Fork variant
Frederick
French
Georgeville
Germanna
Gertie
Glenville
Goblintown
Goldsboro
Goldvein
Goresville
Groseclose
Gullion
Guyan
Gwinnett variant
Hagerstown
Halewood
Hayesville
Haymarket
Herndon
Hibler
Hiwassee
Hoadly
Huntington
Iotla
Izagora
Jedburg
Johns
Kelly
Kenansville variant
Keyport
Kinkora
Lackstown
Lakehurst variant
Leaf
Leaksville
Lenoir
Library
Lignum
Lindside
Littlejoe
Lloyd
Lloyd variant
Lobdell
Lodi
Lowell
Lucketts
Lunt
Lynchburg
Madison
Manassas
Mantachie
Marbie
Margo
Marlboro
Masada
Massanetta
Matapeake
Mattapex
Mattaponi
Maurertown
Mayodan
McGary
McQueen
Mecklenburg
Mecklenburg variant
Meggett
Melvin, drained
Melvin, undrained
Minnieville
Mirerock
Mixed alluvium, well drained
Monacan
Mongle
Monongahela
Montalto
Montross
Moomaw
Mount Lucas
Nahunta
Nanford
Nason
Nathalie
Neabsco
Newark variant
Newark, drained
Newark, undrained
Newflat
Newmarc
Nicelytown
Nicholson
Nixa

Nolin
Nomberville
Oak Level
Oaklet
Ochlockonee variant
Ochrepts, D
Ocilla
Okeetee
Orange variant
Orenda
Orrville
Orthents
Othello
Pacolet
Pactolus
Pagebrook
Penhook
Pineywoods
Pisgah
Pooler variant
Poplimento
Pouncey
Psamments, mod well
Psamments, somewhat poorly
Purcellville
Purdy
Quantico
Rabun
Rapidan
Raritan
Rasalo
Readington
Reaville
Redbrush
Roanoke
Roanoke, drained
Roanoke, undrained
Rockbarn
Rohrersville
Rowland
Santuc
Savannah
Scattersville
Seabrook
Seneca
Shelocta variant
Shenval
Sheva
Shottower
Siloam
Sindion
Slabtown
Slagle
Snowdog
Spears Mountain
Spotsylvania
Springwood
Stoneville
Straightstone
Strawfield
Sugarhol
Susquehanna
Swampoodle
Swimley
Sycoline
Tallapoosa
Tallapoosa variant
Tarrus
Tatum
Tetotum
Tetotum variant
Timberville
Toast
Toddstav
Toms
Totier
Tugglesgap
Tumbling
Turbeville
Tygart
Udipsamments, mod well
Udipsamments, well
Unison
Unison variant
Vance
Varina
Vertrees
Virgilina
Wadesboro
Wadesboro
Wahee
Warminster
Waxpool
Weaver
Wedowee
Westfield
Wharton
White Store
White Store variant
Wilkes
Winnsboro
Wintergreen
Winton
Wolftrap
Woodstown
Woolwine

Worsham
Worsham variant
Wrightsboro
Yellowbottom
Yemassee
Yeopim
York
Zion variant

Attachment #3

References for “Suggested Nitrogen Mineralization Rates for Non Intensively Stabilized Biosolids Land Applied in Virginia.”

Gilmour, J.T. and M.D. Clark, 1988, Nitrogen release from wastewater sludge: A site specific approach. J. Water Pollut. Control Fed. 60:494-498.

Gilmour, J.T., C.G. Cogger, L.W. Jacobs, S.A. Wilson, G.K. Evanylo, and D.M. Sullivan. 2000. Estimating plant-available nitrogen in biosolids. Final report to the Water Environmental Research Foundation. Project 98-REM-3. Water Reuse and Biosolids. 49 p.

Gilmour J.T. C.G. Cogger, L.W. Jacobs, G.K. Evanylo, and D.M. Sullivan. 2003. Decomposition and plant-available nitrogen in biosolids: Laboratory studies, field studies, and computer simulation. J. Environ. Qual. 32: 1498-1507.

Attachment #4

FOR COMMITTEE DISCUSSION PURPOSES:
POTENTIAL APPROACHES TO ADDRESS ISSUES RAISED

August 18, 2004

- **Depth of Soil Sampling:** Representative soil ~~samples~~ sample cores shall be obtained from the soil surface to a depth of ~~two to~~ four inches (0 – 4") for fields which ~~are not tilled~~ have not been tilled within the past three years, and from the soil surface to a depth of six ~~to eight~~ inches (0-6") for fields which are tilled or have been tilled within the past three years. Soil sampling of fields based on grids of subfield areas may be utilized.

- **Potassium & Other Nutrients**: Recommended application rates for potassium, secondary nutrients, and micronutrients ~~should~~ shall be at agronomically or economically justifiable levels for expected crop production. Potassium applications sufficient to meet crop nutrient needs shall be included in nutrient management plans for all fields using current soil analysis levels consistent with procedures contained in Virginia Nutrient Management Standards and Criteria, Revised 2004.

- **Soil pH:** Soil pH influences nutrient availability and crop nutrient utilization and should be adjusted to the level suited for the crop. Nutrient management plans shall contain lime recommendations to maintain soil pH in the agronomic range for the existing crop or crop(s) to be grown. Recommendations shall address lime application if soil pH is below the optimal range. Nutrient management planners shall not recommend the application of lime, lime amended materials, or nutrient sources that will raise the soil pH above the optimum range for the growing crop or crop(s) to be grown based on recommendations contained in Virginia Nutrient Management Standards and Criteria, Revised 2004.

- **Setbacks & Buffers:** The planner shall recommend buffer zones around wells, springs, surface waters, sinkholes, and rock outcrops where manure, ~~or~~ biosolids, or industrial waste should not be applied. Such buffer zones recommended shall be consistent with the greater of criteria contained in Virginia Nutrient Management Standards and Criteria, Revised ~~November 1995~~ 2004, Biosolids Use Regulations for biosolids applications, or VPDES or VPA regulations for operations required to apply for such permits.

- **Duration of Plan:** A site-specific nutrient management plan developed in accordance with all requirements of these regulations, including specified crops or crop rotations, shall provide information on soil fertility and seasonal application of required nutrients for one to five years of crop production. Plans developed for a period of time greater than three years and up to five years ~~should generally~~ shall be limited to sites in permanent pasture or continuous hay ~~rotations~~.

- **Plan Modification:** The plan shall ~~indicate a need for~~ state a requirement for modification if ~~cropping systems, rotations, fields,~~ (i) animal numbers increase above the level specified in the plan, (ii) animal ~~type~~ types including intended market weights~~, or management~~ are changed, ~~added or removed~~ (iii) additional imported manure, biosolids, or industrial waste that was not identified in the existing plan is to be applied to fields under the control of the operator, or (iv) ~~. The planner shall state in the plan that such plan will be invalid if~~ available land area for the utilization of manure decreases below the level necessary to utilize manure in the plan~~, or if changes in animal numbers or type affect land area necessary to utilize manure~~. The plan shall also require modification if cropping systems, rotations, or fields are changed and phosphorus will be applied at levels greater than crop nutrient needs based on soil analysis results as determined from procedures in Virginia Nutrient Management Standards and Criteria, Revised 2004.